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(54) PREPARATION OF CUBIC BORON NITRIDE-TYPE TOOL MATERIAL

(57)Abstract:

PURPOSE: To manufacture the cubic boron nitride-type tool material excellent in resistance to oxidation and heat and mechanical strength, by sintering the mixture of cubic boron nitride, alumina, aluminum and stabilized zirconia having specified composition under a specified condition.

CONSTITUTION: A mixture comprising 40W70wt% cubic boron nitride powder, 40.5W15% alumina powder, 5W10wt% aluminum powder and 0.5W5% stabilized zirconia powder composed of 95.5W93.8% zirconia and 4.5W6.2% yttria is poured in a vessel, settled in a chamber for generating a high temperature and high pressure and then sintered. Said sintering comprises presintering and main sintering steps. The presintering is performed by compressing the mixture at 33,000W 42,000kg/cm² at first, gradually raising a temperature up to 1,000W1,400°C and then holding the temperature for 10W30min. In succession, the main sintering is performed by raising pressure to 42,000W55,000kg/cm², controlling the temperature at 1,400W1,700°C and then holding the temperature for 20W60min. Thereafter, the temperature in the chamber is lowered to 300°C, the pressure is returned to an ordinary value, and then the sintered body is taken out.

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